

## REMARKS

Claims 1-23 and 39-52 are pending in the application. Claims 24-38 have been cancelled. Claims 1, 4, 23, 39, and 42-44 have been amended. New claims 52 and 53 have been added. Support for the amendments and the new claim may be found throughout the application as filed including, but not limited to, paragraph 35 on pages 9 and 10 and page 11, paragraph 39.

In view of the following remarks, reconsideration and withdrawal of the rejections to the application in the Office Action is respectfully requested.

### ***I. REJECTION OF CLAIMS 39-43 UNDER 35 U.S.C. § 112, Second Paragraph***

The Examiner rejected Claim 39 under 35 U.S.C. § 112, Second Paragraph because the phrase “nanoparticles of silver” lacked antecedent basis. Claim 39 has been amended to provide antecedent basis for the offending phrase.

The Examiner rejected claim 43 under 35 U.S.C. § 112, Second Paragraph, alleging that the repeated recital of dependency on claim 39 and the reference to “the dense medium produced by the method of claim 39” rendered claim 43 confusing. Claim 43 has been amended to remove one of the recitals of dependency and to replace the phrase “the dense medium produced by the method of claim 39” with the phrase “the colloidal silver produced by the method of claim 39.”

Applicants believe these amendments overcome the Examiner’s rejections and respectfully request that these rejections be withdrawn.

### ***II. REJECTION OF CLAIMS 1, 5, 6 AND 8-15 UNDER 35 U.S.C. § 102(b) or 103(a)***

The Examiner rejected Claims 1, 5, 6 and 14 under 35 U.S.C. § 102(b) as anticipated by U.S. Patent No. 4,416,751, issued to Berkowitz (hereinafter “Berkowitz”). In addition the Examiner rejected claims 8-13 and 15 under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over Berkowitz. Applicants respectfully traverse.

In order to establish a prima facie case of anticipation under 35 U.S.C. § 102, or a prima facie case of obviousness based on a single reference under 35 U.S.C. § 103, the cited reference

must teach each or suggest each and every limitation of the rejected claim. Berkowitz fails to teach or suggest a method for producing a colloidal dispersion of nanoparticles that includes the steps of: 1) providing a rotatable first electrode and 2) providing a *static* second electrode, as recited in claim 1 of the pending application.

Berkowitz teaches an apparatus having two electrodes. The first electrode is mounted to a container and moved with it as the container is slowly moved back and forth. (See col. 5, lines 16-24.) The second electrode is mounted to a rotating spindle. Because both of the two electrodes are either moving back and forth or rotating, neither can be said to be a “static” electrode as recited in the rejected claims. Therefore, Berkowitz fails to teach each and every limitation of the rejected claim and Applicants respectfully request that this rejection be withdrawn.

### ***III. REJECTION OF CLAIMS 1-15, 17, 21, 23 and 39-43 UNDER 35 U.S.C. § 103(a)***

The Examiner rejected claims 1-15, 17, 21, 23 and 39-43 under 35 U.S.C. § 103(a) as obvious over either U.S. Patent No. 5,061,354, issued to Smith et al. (hereinafter “Smith”) or U.S. Patent No. 4,731,515, issued to Savage et al. (hereinafter “Savage”) in view of Berkowitz and/or U.S. Patent No. 5,534,232, issued to Denes et al. (hereinafter “Denes”). Applicants respectfully traverse.

In order to establish a *prima facie* case of obviousness based on two or more references, the cited references, alone or in combination, must teach all limitations of the rejected claims. In addition, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the references or to combine reference teachings. (MPEP 2142)

All of the rejected claims recite an apparatus having a rotatable first electrode and a static second electrode. As discussed in section II above, Berkowitz does not teach an apparatus having a *static* electrode. It follows that neither the combination of Smith and Berkowitz nor the combination of Savage and Berkowitz teaches all of the limitations of the rejected claims. Moreover, the Examiner has failed to identify any language in the cited references that would motivate a person of ordinary skill in the art to modify the apparatus of Berkowitz to include a

static electrode. Therefore Applicants respectfully request that all of the rejections based on Berkowitz be withdrawn.

In support of the rejections based on the combination of Smith or Savage with Denes, the Examiner relies on the background (or Prior Art) sections of Smith and Savage, which only generally disclose that processes for creating metallic powders using a spark discharge in a dielectric liquid are known. The Examiner combines these teachings with the disclosure of Denes of a dense medium plasma process for producing organic materials. However, Applicants respectfully submit that there is no motivation or suggestion provided in the cited references to use the apparatus of Denes in the processes of Smith or Savage.

As motivation to combine Smith or Savage with Denes, the Examiner states, “the selection of any known equivalent arrangement of electrodes for producing the metallic powders by spark erosion would have been within the level of ordinary skill in the art.” Applicants respectfully submit that this statement ignores the requirements in the MPEP that state “the level of skill in the art cannot be relied upon to provide the suggestion to combine references,” and “the mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination.” (MPEP 2143.01) Finally, because the apparatus of Denes is not actually designed to produce metallic powders, the Denes electrodes are not properly considered “a known equivalent arrangement of electrodes for producing metallic powders.”

Denes is directed to methods and apparatus for synthesizing polymers and carbon-based materials, such as polyenes, polyynes, polymeric polyradicals, carbon cage derivatives “and other new *organic* materials” by reacting dense phase chemicals. (See abstract; col. 4, lines 6-12; and col. 5, lines 22-32; emphasis added.) Denes does mention, briefly, that the use of some electrodes resulted in nanoparticle implantations. However, the electrode arrangement in Denes was not designed for the purpose of producing metallic powders. Rather, the electrode arrangement in Denes was specifically designed to prevent thermal degradation and decomposition of the *organic* products by quickly removing them from the reaction zone. This is discussed throughout the specification and is specifically addressed in col. 3, lines 47-51 and 56-62; and in col. 10, lines 19-23. Thermal degradation and decomposition are not a concern in the

production of *inorganic* products, such as metallic powders. Therefore, the teachings of Denes do not provide any motivation to use the electrode assembly described therein in a process for the production of metallic powders.

These arguments against obviousness are strengthened by the present amendments to independent claims 1, 39 and 44, which specify that water is used as a dense medium. In light of these amendments, the disclosures of Smith and Savage are relevant only in that they state spark erosion may be carried out using water as the dielectric. However, a spark erosion using water as the dielectric is incapable of producing an organic reaction product, such as a polymer or carbon cage derivative, as described in Denes. Therefore, the problem which the electrode assembly of Denes seeks to solve (i.e., the prevention of thermal decomposition of organic reaction products) is irrelevant to disclosure of Smith and Savage. As such, Denes does not provide any motivation to use the electrode assembly described therein in the processes described in Smith and Savage.

For each of the reasons listed above, Applicants respectfully submit that the rejected claims are not obvious over either Smith or Savage in view of Berkowitz and/or Denes, and respectfully request that the rejections be withdrawn.

#### **IV. REJECTION OF CLAIMS 116, 18-22 and 22 UNDER 35 U.S.C. § 103(a)**

The Examiner rejected claims 16, 18-20 and 22 under 35 U.S.C. § 103(a) as obvious over either Smith or Savage in view of Berkowitz and/or Denes and further in view of U.S. Patent No. 5,660,465, issued to Mason (hereinafter "Mason"). Applicants respectfully traverse.

In order to establish a *prima facie* case of obviousness based on two or more references, the cited references, alone or in combination, must teach all limitations of the rejected claims. In addition, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the references or to combine reference teachings. (MPEP 2142)

All of the rejected claims recite an apparatus having a rotatable first electrode with pins projecting from its surface and a static second electrode. As discussed in section II above, Berkowitz does not teach an apparatus having a *static* electrode. It follows that neither the

combination of Smith with Berkowitz and Mason nor the combination of Savage with Berkowitz and Mason teaches all of the limitations of the rejected claims. Moreover, the Examiner has failed to identify any language in the cited references that would motivate a person of ordinary skill in the art to modify the apparatus of Berkowitz to include a static electrode. Therefore Applicants respectfully request that all of the rejections based on Berkowitz be withdrawn.

The combined teachings of Smith or Savage with Denes and Mason do not provide any suggestion or motivation to modify the rotating electrode of Denes to include pins projecting from its planar surface, as recited in rejected claim 16 (and in new claim 52). Mason discloses a screw conveyor provided with mixing pins to enhance the mixing action of a cementitious material with water and a liquid agent. (See col. 5, lines 54-61.) The Examiner suggests that one of ordinary skill in the art would have been motivated to modify the electrode of Denes to include the pins of Mason “because it would result in further enhancing the mixing action.” However, the mixing action described in Mason does not occur in the plasma reactor of Denes.

The “mixing action” described in Mason is designed to blend solid and liquid components into a slurry. (See col. 4, lines 29-32.) In contrast, the recirculation of a dense fluid medium in the plasma reactor of Denes is designed to create a centrifugal force that moves old reactant material out of a plasma reaction zone and draws new reactant material in. The role of the electrodes in achieving this effect is described in Denes as follows:

The reactant material 44 must be circulated between the upper and lower planar electrode faces 40, 54 because the plasma reaction only occurs in the planar gap 56 located between the electrode faces 40, 54. The recirculation at step 94 of the reactant material 44 results from the centrifugal force created by the rotation at step 92 of the upper planar electrode face 40 relative to the lower planar electrode face 54. This centrifugal force causes the reactant material 44 located between the electrode faces 40, 54 to move radially outward in the direction of arrows 57,59. The radial outward movement of the reactant material 44 creates a vacuum effect which draws more reactant material 44 from within the reaction vessel 12 in the direction of arrows 43 through the plurality of ports 42 located in the upper rotatable electrode 28, into the upper hollow shaft 32 of the upper rotatable electrode 28, and down through the central opening 58 of the upper rotatable electrode 28 to the planar gap 56 located between the electrode faces 40, 54.

The rotation at step 92 of the upper rotatable electrode 28 also aids in recirculating the reactant material 44 at step 94 between lower and upper sites 60, 62 contained within the reaction vessel 12. The same centrifugal force created by rotating the upper planar electrode face 40 in relation to the lower planar electrode face 54 at step 92 causes some of the reactant material 44 located in the planar gap 56 between the electrode faces 40, 54 to gravitate into the lower portion of the reaction vessel 12. This gravitation of reactant

material 44 subsequently forces reactant material 44 to recirculate from a lower site 60 within the reaction vessel 12 to an upper site 62 within the reaction vessel 12 at step 94 via the reactant recirculation line 18 and peristaltic pump 80 which comprises part of the medium density plasma reactor 10. In summary, the centrifugal force created by rotating the upper rotatable electrode 28 induces a very intense movement and mixing of the reactant material 44.

(See col. 9, line 52 through col. 10, line 19.) As illustrated by the passages above, the recirculation described in Denes involves specific fluid dynamics that are very different from the "mixing action" (i.e., blending) taught by Mason. Therefore, the cited references provide no motivation to modify the rotating electrode of Denes to include the pins of Mason. In fact, the passages above tend to teach away from the inclusion of pins on the rotating electrode because the inclusion of such pins risks disrupting the centrifugal force and the ability of the reactant materials "to move radially outward" from the gap between the electrodes.

For each of the reasons discussed above, Applicants respectfully request that the rejections be withdrawn.

#### ***IV. PRELIMINARY AMENDMENT***

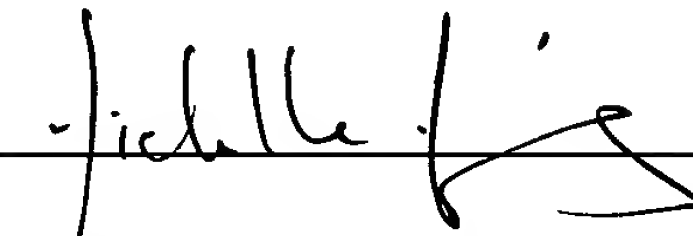
Applicants filed a preliminary amendment adding new claims 44-51 on January 14, 2005. It appears that this preliminary amendment was not entered by the Examiner prior to the preparation of the Office Action. Applicants respectfully request entry of that the preliminary amendment at this time. The patentability of previously presented claims 44-51 and newly added claims 52 and 53 over the prior art cited in the Office Action is supported by the same arguments presented above with respect to claims 1-23 and 39-43.

In view of the foregoing remarks, applicants respectfully submit that all of the claims remaining in the application are in condition for allowance and favorable action thereon is respectfully solicited.

Respectfully submitted,

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